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COHEN, PONTANI, LIEBERMAN & PAVANE
551 FIFTH AVENUE
SUITE 1210
NEW YORK, NY 10176

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| EXAMINER |
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DANIELSEN, NATHAN ANDREW

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2627

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08/20/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/825,771

Applicant(s)

SAKAMOTO ET AL.

Examiner

Nathan Danielsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. Claims 1-8 and 10-23 are pending. Claim 8 was canceled and claims 21-23 were added in applicant's amendment filed 01 June 2007.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: --Optical Pickup Apparatus Including A Light Intensity Distribution Converting Element--.

Claim Objections

3. Claims 2 and 3 are objected to because each contains the limitation "an outermost periphery of the effective aperture", which can also be found in claim 1, from which both depend. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-8, 10-12, 15, 17-19, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tawa et al (US Patent 6,469,838; hereinafter Tawa), in view of Nishino et al (European Patent Application Publication 1300828; hereinafter Nishino).

Regarding claim 1, Tawa discloses an optical pickup apparatus for reproducing and/or recording information on an optical information recording medium (figure 17), comprising:

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a light source to emit a light flux (element 52 in figure 17), the emitted light flux having a light intensity distribution in nearly Gaussian distribution (col. 7, lines 27-43);

a light intensity distribution converting element (element 54 in figure 17) to transform the light intensity distribution of the light flux emitted by the light source into a desired light intensity distribution wherein a light intensity of an outgoing light passing through an outermost periphery of an effective aperture of the light intensity distribution converting element becomes 45%-95% of a light intensity of an outgoing light passing through an optical axis position of the light intensity distribution converting element (figure 14 and col. 8, lines 49-58; where one of ordinary skill in the art would know how to obtain any desired intensity distribution between 0% and 100% at the outermost periphery by utilizing the disclosure of Tawa); and

an objective optical element to converge a light flux emitted by the light intensity distribution converting element onto an information recording surface of the optical information recording medium (element 56 in figure 17).

However, Tawa suggests in col. 1, lines 17-22, yet fails to explicitly disclose, where the light flux has a wavelength in the range of 200-700 nm.

In the same field of endeavor, Nishino discloses a light source that emits a wavelength in the range of 200-700 nm (¶ 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a wavelength between 200 and 700 nm in an optical disc apparatus, as taught by Nishino, for the purpose of recording data at a high density (¶ 7).

Regarding claim 2, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. Additionally, Tawa discloses where the optical intensity distribution converting element transforms the light intensity distribution in nearly Gaussian distribution of the light flux emitted by the light source into a desired light intensity distribution, wherein the light intensity of the outgoing light passing through the outermost periphery of the effective aperture of the light intensity distribution converting element becomes

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60%-80% of a light intensity of an outgoing light passing through an optical axis position of the light intensity distribution converting element (figure 14B and col. 8, lines 49-58, as explained in claim 1).

Regarding claim 3, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. Additionally, Tawa discloses where the light intensity distribution converting element satisfies the following formula:

$$1.2 < (C / D) / (B / A) < 1.5$$

where A is a light intensity of an incident light around the outermost periphery of the effective aperture, B is a light intensity of an incident light on an optical axis position, C is the light intensity of an outgoing light around the outermost periphery of an effective aperture and D is the light intensity of an outgoing light on the optical axis position (figure 14B and col. 8, lines 49-58, as explained in claim 1).

Regarding claim 4, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. Additionally, Tawa discloses where the optical pickup apparatus comprises a beam expander, and wherein the beam expander comprises the optical intensity distribution converting element (element 10 in figure 18) and at least one optical element (element 54 in figure 18).

Regarding claims 5 and 11, Tawa, in view of Nishino, discloses everything claimed, as applied to claims 4 and 1, respectively. Additionally, Tawa suggests where the optical element or the optical intensity distribution converting element is displaceable along the optical axis and wherein the beam expander has a spherical aberration correcting function (col. 9, lines 6-24).

Regarding claim 6, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 4. Additionally, Tawa suggests where the optical element or the optical intensity distribution converting element is fixed along the optical axis and wherein the beam expander has a spherical aberration correcting function (col. 9, lines 6-24).

Regarding claim 7, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 4. Additionally, Tawa discloses where the beam expander is Keplerian type (figure 16).

Regarding claim 8, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 5. Additionally, Tawa discloses where the beam expander is Galilean type (figure 18).

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Regarding claim 10, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. Additionally, Tawa discloses where the light intensity distribution converting element is provided separately from the objective optical element (figure 17).

Regarding claim 12, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. However, Tawa fails to disclose where the beam that is expanded is first collimated.

In the same field of endeavor, Nishino discloses where a collimating element for emitting an infinite light flux in the case that a finite light flux is introduced thereto is arranged between the light source and the light intensity distribution converting element (figure 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have placed a collimator lens between the light source and the light intensity distribution converting element, as taught by Nishino, for the purpose of matching the aperture radius of the objective lens to the light flux diameter of the collimated light flux from a collimator lens (§ 55).

Regarding claim 15, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. However, Tawa fails to disclose where the objective optical element has a numerical aperture NA of 0.65 and more.

In the same field of endeavor, Nishino discloses where the objective optical element has a numerical aperture NA of 0.65 or more (§ 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized an objective lens having a numerical aperture greater than or equal to 0.65, as taught by Nishino, for the purpose of recording data at a high density (§ 7).

Regarding claim 17, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. However, Tawa fails to disclose where the objective optical element is formed by a plastic material.

In the same field of endeavor, Nishino discloses where the objective optical element is formed by a plastic material (§ 15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the lens by a plastic material, as taught by Nishino, for the purpose of reducing costs (§ 15).

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Regarding claim 18, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. Additionally, Tawa discloses where the objective optical element is formed by a glass material (col. 3, lines 62 and 63).

Regarding claim 19, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. However, Tawa fails to disclose where the optical pickup apparatus further comprises a chromatic aberration correcting element.

In the same field of endeavor, Nishino disclose where the optical pickup apparatus further comprises a chromatic aberration correcting element (element 7 in figure 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a chromatic aberration correcting element in the beam expander of Tawa, as taught by Nishino, for the purpose of correcting chromatic aberration (§ 15).

Regarding claim 23, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. However, Tawa fails to disclose where both the incoming and outgoing light fluxes are parallel.

In the same field of endeavor, Nishino discloses where the light flux incident to the optical intensity distribution converting element is a parallel light flux and the light flux emitted from the optical intensity distribution converting element is a parallel light flux (element 2 in figures 1, 3, 4, 6, 10, and 18-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the optical element(s) of Tawa in the manner suggested by Nishino, for the purpose of matching the aperture radius of the objective lens to the light flux diameter of the collimated light flux from the collimator lens (§ 54).

6. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tawa, in view of Nishino, and further in view of Maruyama et al (US Patent Application Publication 2001/0028626; hereinafter Maruyama).

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Regarding claims 13 and 14, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. However, Tawa, in view of Nishino, fails to disclose where the objective lens comprises a ring-shaped diffractive structure.

In the same field of endeavor, Maruyama discloses where an optical functional surface of the objective optical element comprises an optical path difference providing ring-shaped structure which includes ring-shaped zones around the optical axis and is structured so that the ring-shaped zones provide pre-defined optical path differences to light fluxes passing through the each ring-shaped zone between light fluxes passing through neighboring zones, wherein the optical path difference providing structure is one of a diffractive structure, a phase structure and multi-level structure (§§ 69 and 101 and figures 1 and 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the objective lens of Tawa with the diffraction structure of Maruyama, for the purpose of canceling spherical aberration in the optical system (§ 69).

7. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tawa, in view of Nishino, and further in view of Arai et al (US Patent 5,818,809; hereinafter Arai).

Regarding claim 16, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. However, Tawa, in view of Nishino, fails to disclose where the objective optical element is tilted to the optical axis so that a comatic aberration is corrected.

In the same field of endeavor, Arai discloses where the objective optical element is tilted to the optical axis so that a comatic aberration is corrected (col. 7, lines 22-30).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have tilted the optical axis of the objective lens, as taught by Arai, for the purpose of correcting comatic aberration generated in the objective lens (col. 7, lines 22-30).

8. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tawa, in view of Nishino, and further in view of Chung et al (US Patent 6,442,124; hereinafter Chung).

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Regarding claim 20, Tawa, in view of Nishino, discloses everything claimed, as applied to claim 1. However, Tawa, in view of Nishino, fails to disclose where the optical pickup apparatus further comprises a plurality of light sources and conducts information recording and/or reproducing on various optical information recording media.

In the same field of endeavor, Chung discloses where the optical pickup apparatus further comprises a plurality of light sources and conducts information recording and/or reproducing on various optical information recording media (col. 4, lines 3-16 and figures 1, 3, and 4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included the three light sources of Chung in the apparatus of Tawa, for the purpose of recording/reproducing information on/from CDs, DVDs, and HD-DVDs (col. 2, lines 48-51 in combination with col. 1, lines 35-65).

Regarding claim 21, Tawa, in view of Nishino and Chung, discloses everything claimed, as applied to claim 20. However, Tawa, in view of Nishino, fails to disclose the wavelengths of the three light sources and the protective layers of the various optical information recording media.

In the same field of endeavor, Chung discloses where:

the light source emits the light flux with a wavelength in the range of 380 - 450 nm (element 25 in figures 1, 3, and 4 and col. 8, lines 1-4),

the optical pickup apparatus further comprises at least one of a second light source and a third light source, the second light source emitting a second light flux with a wavelength in the range of 600 - 700 nm and the third light source emitting a third light flux with a wavelength in the range of 770 - 830nm (elements 35 and 45 in figures 1, 3, and 4 and col. 4, lines 3-16), and

the objective optical element converges the light flux emitted by the light intensity distribution converting element onto the information recording surface of the optical information recording medium comprising a protective layer whose thickness is 0.1 - 0.7mm, converges the second light flux onto an information recording surface of a second optical information recording medium comprising a protective layer whose thickness is 0.5 -

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0.7mm and converges the third light flux onto an information recording surface of a third optical information recording medium comprising a protective layer whose thickness is 1.1 - 1.3mm (col. 1, lines 43-55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included the three light sources of Chung in the apparatus of Tawa, for the purpose of recording/reproducing information on/from CDs, DVDs, and HD-DVDs (col. 2, lines 48-51 in combination with col. 1, lines 35-65).

9. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tawa, in view of Nishino and Chung, and further in view of Kimura et al (US Patent 2002/0012313; hereinafter Kimura).

Regarding claim 22, Tawa, in view of Nishino and Chung, discloses everything claimed, as applied to claim 21. However, Tawa, in view of Nishino and Chung, fails to explicitly disclose the convergences/divergences for each light source,

In the same field of endeavor, Kimura discloses where the optical pickup apparatus comprises a beam expander (elements 4, 5, 7, and 8 in figure 1), wherein the beam expander comprises the optical intensity distribution converting element and at least one optical element (elements 4, 5, 7, and 8 in figure 1), and wherein the beam expander emits the light flux to the objective optical element as a parallel light flux, emits the second light flux to the objective optical element as a divergent light flux and emits the third light flux to the objective optical element as a divergent light flux (§ 443 in combination with figure 1 and table 7, which shows the light for recording/reproducing on/from an optical disc with a thicker substrate having a divergence angle and the light for recording/reproducing on/from an optical disc with a thinner substrate having no divergence angle).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the apparatus of Tawa with the features and functionality of Kimura, for the purpose of correcting spherical aberration when recording/reproducing data on/from recording media having different substrate thicknesses (§s 441-443).

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Response to Arguments

10. Applicant's arguments filed 01 June 2007 have been fully considered but they are not persuasive.

Regarding applicant's argument that "Tawa fails to teach or suggest any range of the ratio of the light intensity of an outgoing light passing through an outermost periphery and the light intensity of an outgoing light through an optical axis position", the examiner disagrees. As stated in col. 8, lines 49-58 of Tawa, the optical element of Tawa can be configured to "emit light having various light intensity distributions" ranging from a cylindrical distribution with a ratio of ~100% (see figure 14A) to a conical distribution with a ratio of ~0% (see figure 14C), including combinations in between (see figure 14B). Therefore, one of ordinary skill in the art at the time the invention of the instant application was made would have been able to obtain, through routine experimentation, a light intensity distribution converting device outputting a luminous flux having any desired ratio of the peripheral light intensity to the central light intensity. Additionally, col. 9, lines 6-24 suggest that the distance between lenses in an intensity distribution converting lens group, such as the one illustrated in figure 16, can be changed, thus changing the intensity distribution such that the outputted intensity distribution is no longer a uniform intensity distribution. Therefore, this rejection is deemed proper and is hereby maintained.

Closing Remarks/Comments

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Danielsen whose telephone number is (571) 272-4248. The examiner can normally be reached on Monday-Friday, 9:00 AM - 5:00 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (571) 272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nathan Danielsen
08/16/2007

/Thang V. Tran/
Primary Examiner
Art Unit 2627